

PHYSICS COLLOQUIUM

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3:50 PM, Room 111, Life Sciences

“Imaging magnetic surfaces with atomic resolution”

Matthias Bode

Electronic and Magnetic Materials & Devices Group
Center for Nanoscale Materials
Argonne National Laboratory

Fueled by the ever increasing data density in magnetic storage technology and the need for a better understanding of the physical properties of magnetic nanostructures, there exists a strong demand for high resolution, magnetically sensitive microscopy techniques. The technique with the highest available resolution is spin-polarized scanning tunneling microscopy (SP-STM) which combines the atomic resolution capability of conventional STMs with spin sensitivity by making use of the tunneling magnetoresistance effect between a magnetic tip and a magnetic sample surface. Beyond the investigation of ferromagnetic surfaces, thin films, and epitaxial nanostructures with unforeseen precision, it also allows the achievement of a long-standing dream: the real space imaging of atomic spins in antiferromagnetic surfaces.

My talk addresses a wide variety of phenomena in surface magnetism which in most cases could not be imaged directly before the advent of SP-STM. After starting with a brief introduction of the basics of the contrast mechanism, recent major achievements will be presented, like the direct observation of the atomic spin structure of domain walls in antiferromagnets and the visualization of thermally driven switching events in superparamagnetic particles consisting of a few hundreds atoms only. To conclude the lecture, recently observed complex spin structures containing 15 or more atoms will be presented.